N85-32408

EVA-GLASS INTERFACE BOND STABILITY

CASE WESTERN RESERVE UNIVERSITY

Jack L. Koenig

1. DEVELOP SPECTRAL METHODS FOR DETERMINING STRUCTURE OF POLYMER/GLASS INTERFACE (ACCOMPLISHED)
2. EXAMINE STRUCTURAL CHANGES ASSOCIATED WITH HYDROTHERMAL DEGRADATION OF POLYMER/GLASS INTERFACE (IN PROGRESS)
3. DEVELOP METHODS OF INHIBITING THE DEGRADATION REACTION OCCURRING AT POLYMER/GLASS INTEPFACE (FUTURE)

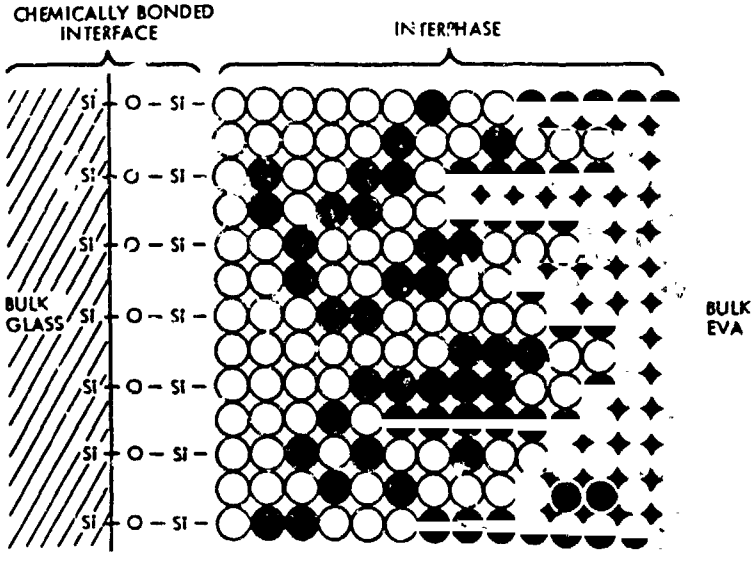


Figure 13. Schematic Representation of the Interdiffusion Model for a Silane-Primed Glass-EVA Joint; Open Circles Indicate Regions of Coupling Agent, Filled Circles Indicate Regions of EVA

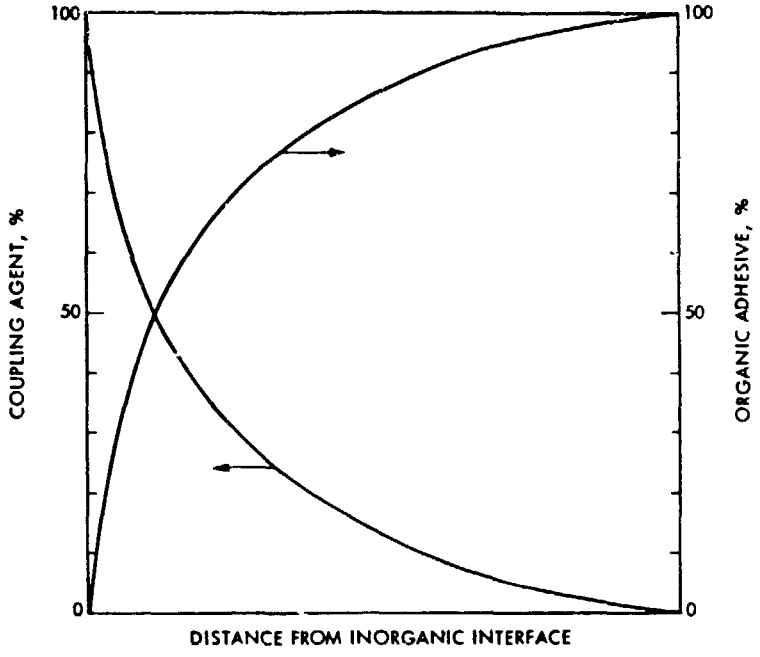
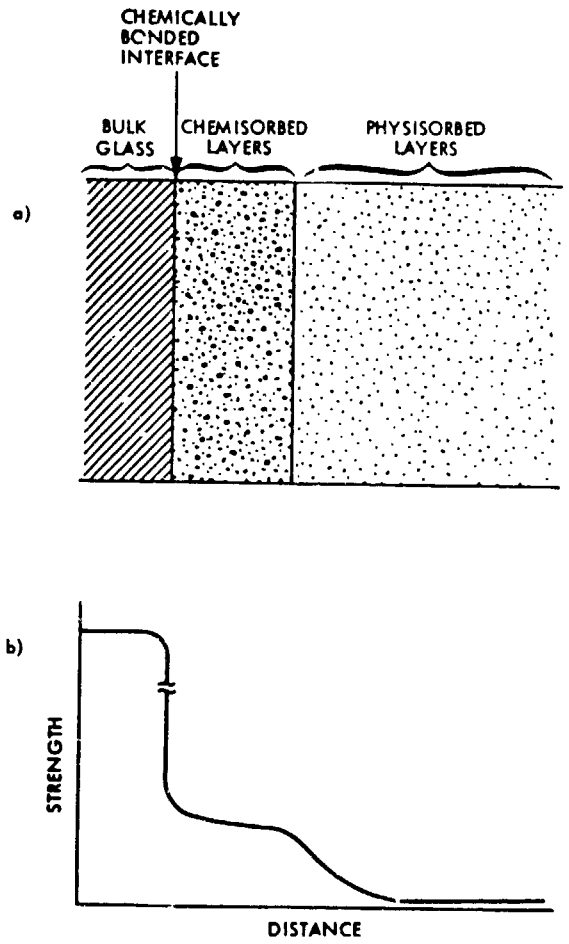
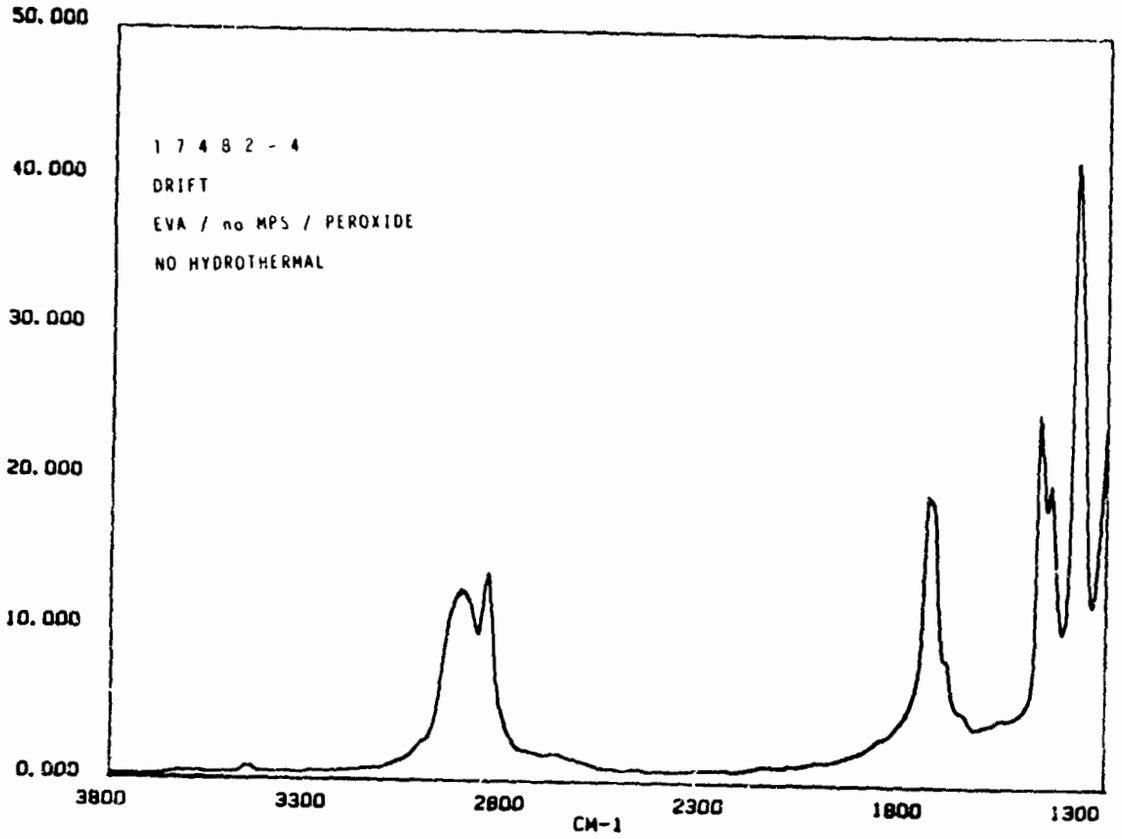
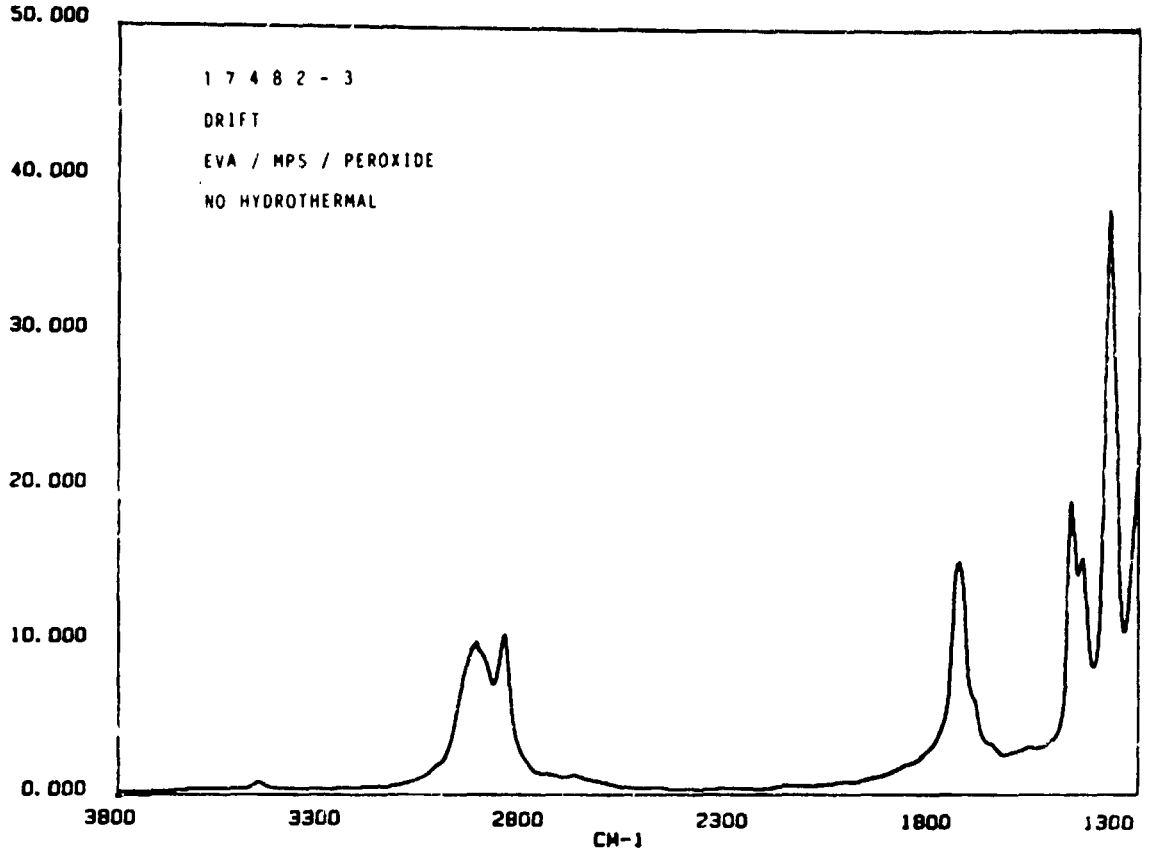
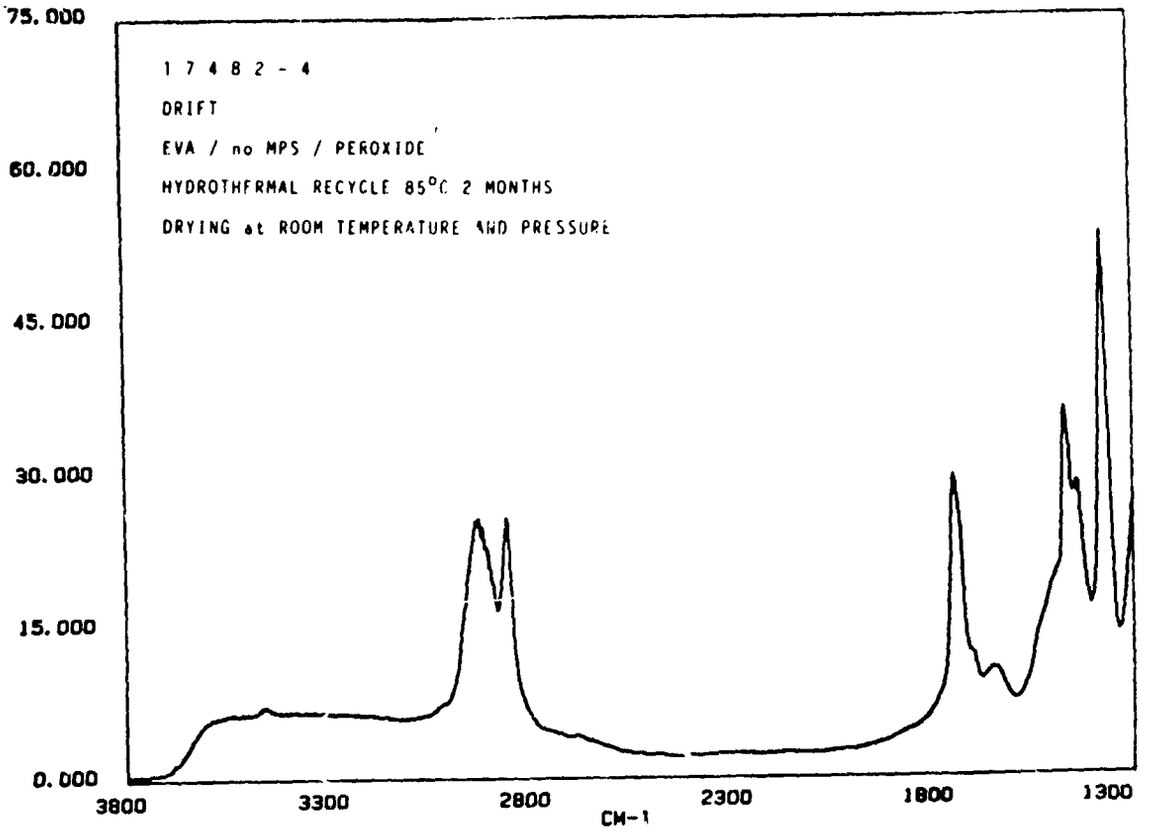


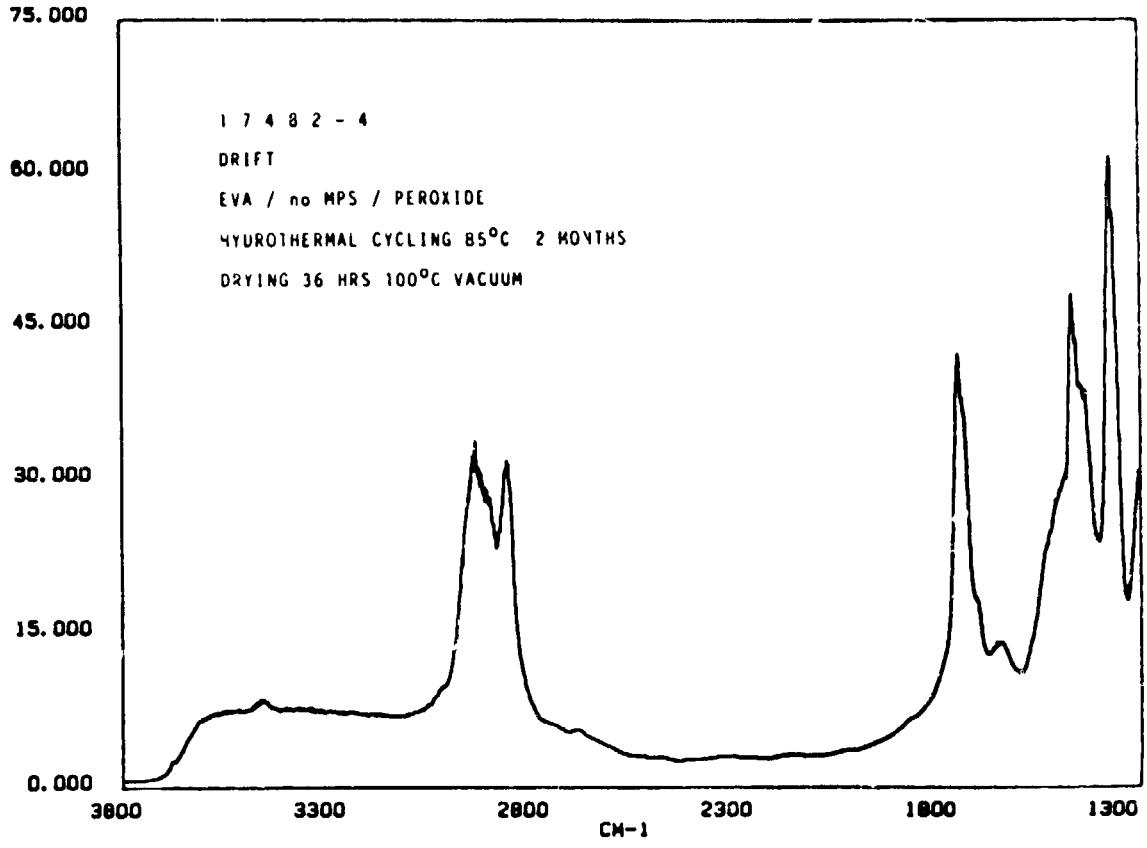
Figure 14. Plot of Silane-Adhesive Concentration Gradient as a Function of Distance From Inorganic Interface

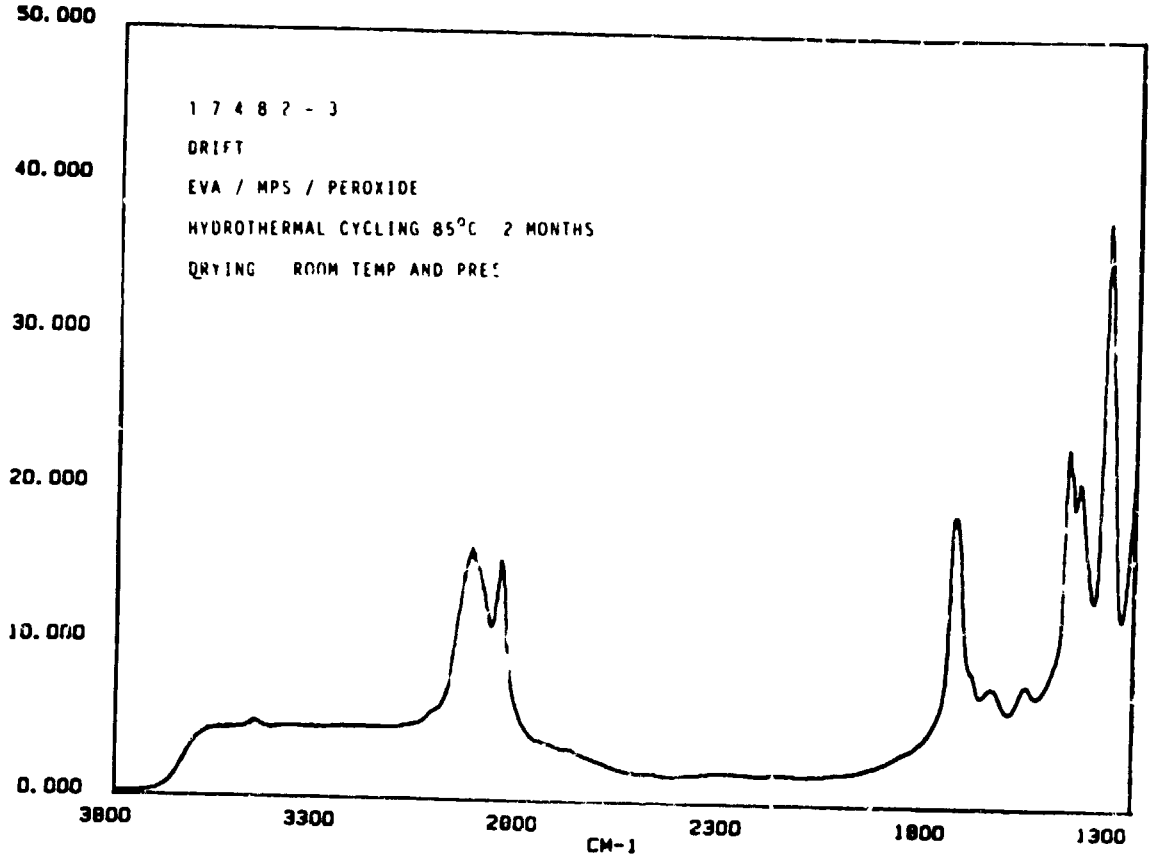


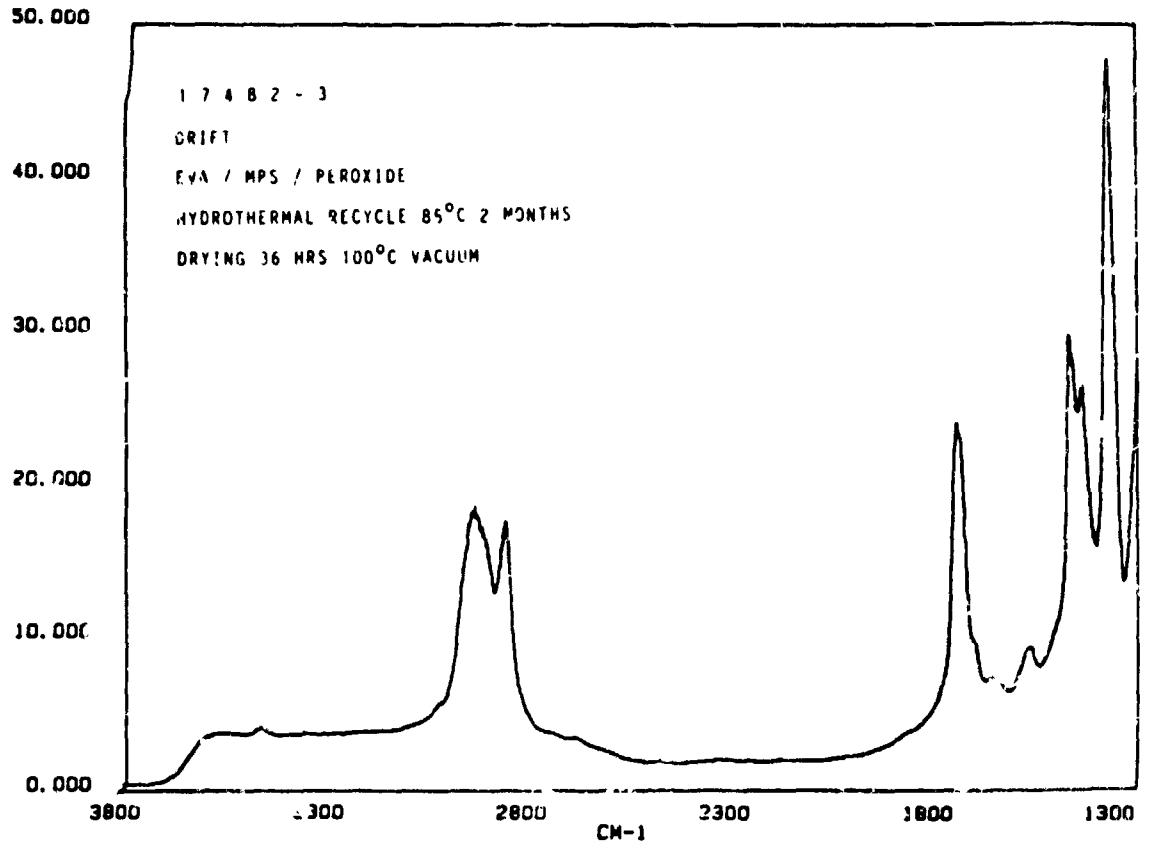

50.000
40.000
30.000
20.000
10.000
0.000
1 7 4 8 2 - 4
DRIFT
EVA / no MPS / PEROXIDE
NO HYDROTHERMAL
3800
3300
2800
2300
1800
1300
CM-1

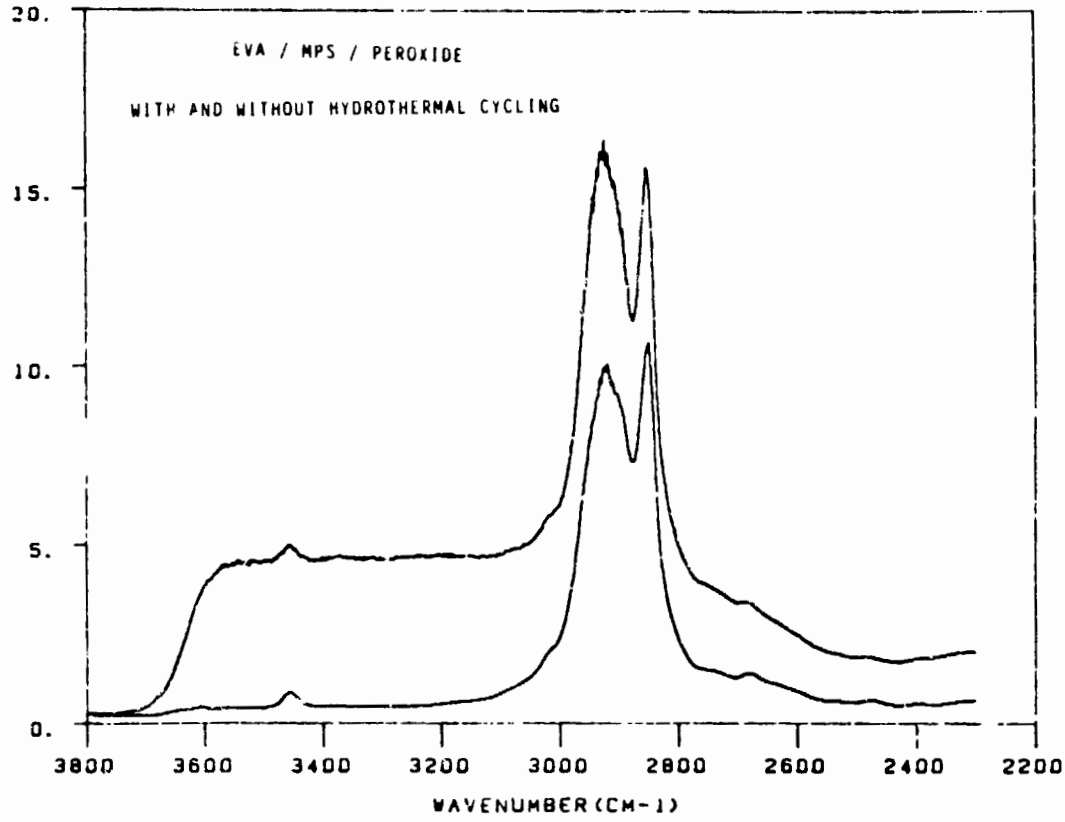

50. 000
40. 000
30. 000
20. 000
10. 000
0. 000
1 7 4 8 2 - 3
DRIFT
EVA / MPS / PEROXIDE
NO HYDROTHERMAL
3800
3300
2800
2300
1800
1300
CM-1


75.000
60.000
45.000
30.000
15.000
0.000
1 7 4 8 2 - 4
DRIFT
EVA / no MPS / PEROXIDE
HYDROTHERMAL RECYCLE 85°C 2 MONTHS
DRYING at ROOM TEMPERATURE AND PRESSURE
3800
3300
2800
2300
1800
1300
CM-1

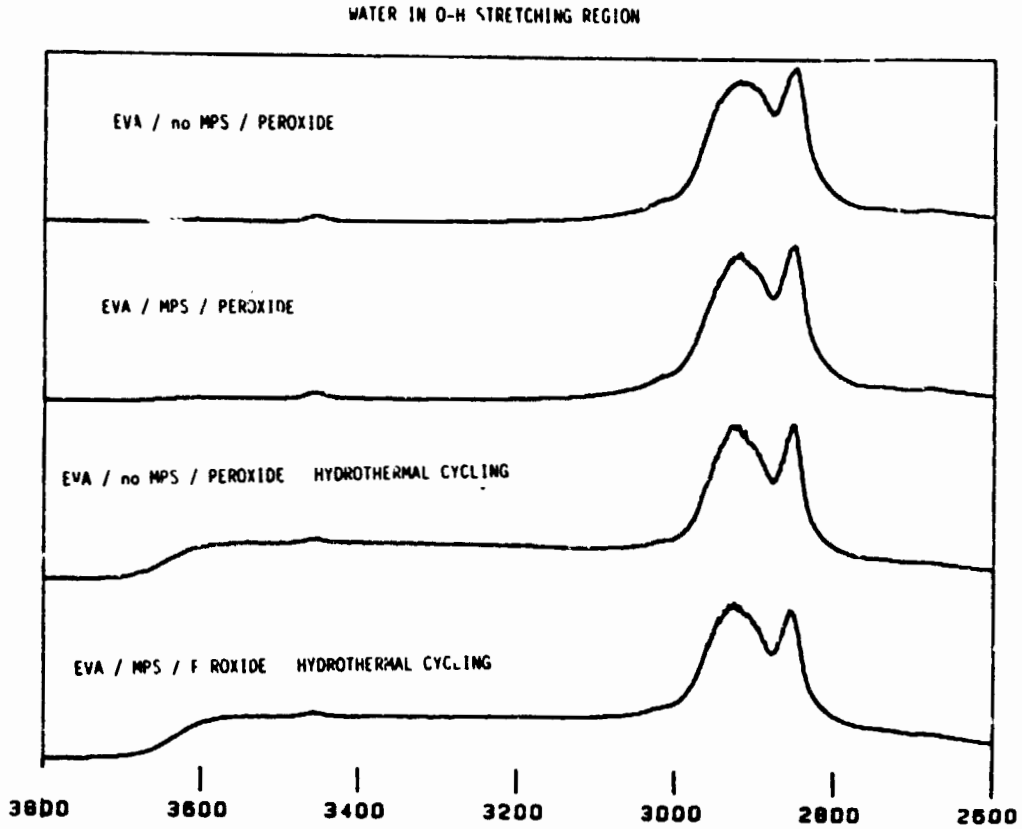

75.000
60.000
45.000
30.000
15.000
0.000
1 7 4 8 2 - 4
DRIFT
EVA / no MPS / PEROXIDE
HYDROTHERMAL CYCLING 85°C 2 MONTHS
DRYING 36 HRS 100°C VACUUM
3800
3300
2800
2300
1800
1300
CM-1


50.000
40.000
30.000
20.000
10.000
0.000
17482-3
DRIFT
EVA / MPS / PEROXIDE
HYDROTHERMAL CYCLING 85°C 2 MONTHS
DRYING ROOM TEMP AND PRES
3800
3300
2800
2300
1800
1300
CM-1

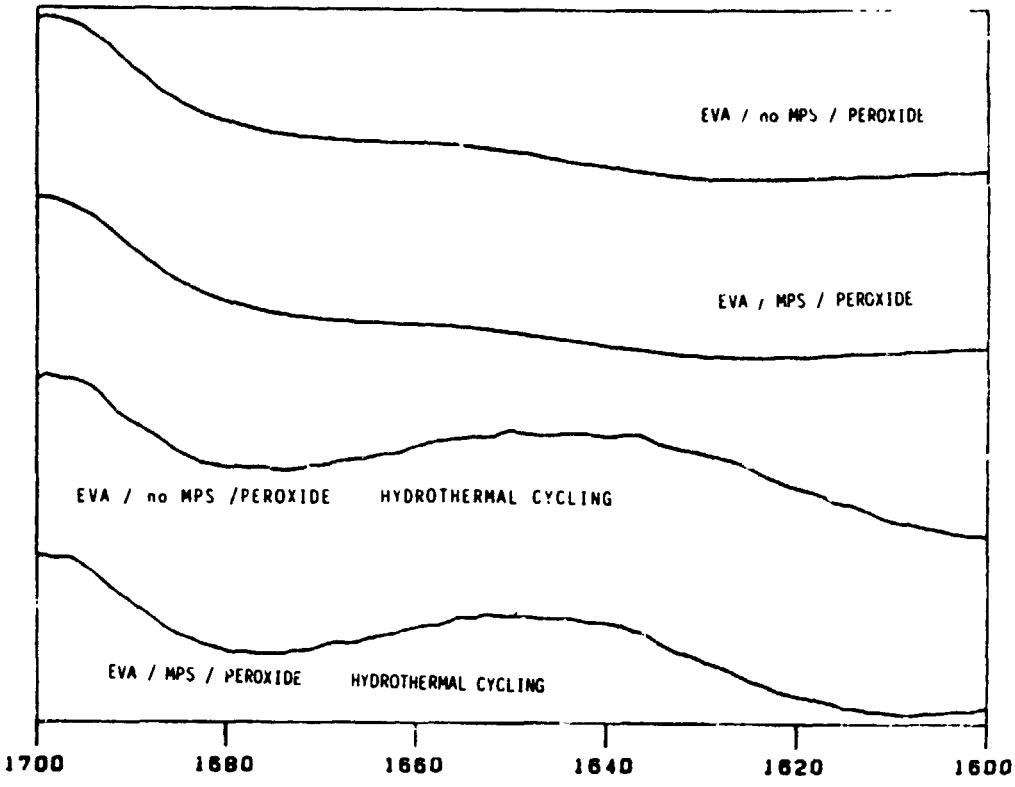

50.000
40.000
30.000
20.000
10.000
0.000
1 7 4 8 2 - 3
DRIFT
EVA / MPS / PEROXIDE
HYDROTHERMAL RECYCLE 85°C 2 MONTHS
DRYING 36 HRS 100°C VACUUM
3800
2800
2300
1800
1300
CM-1

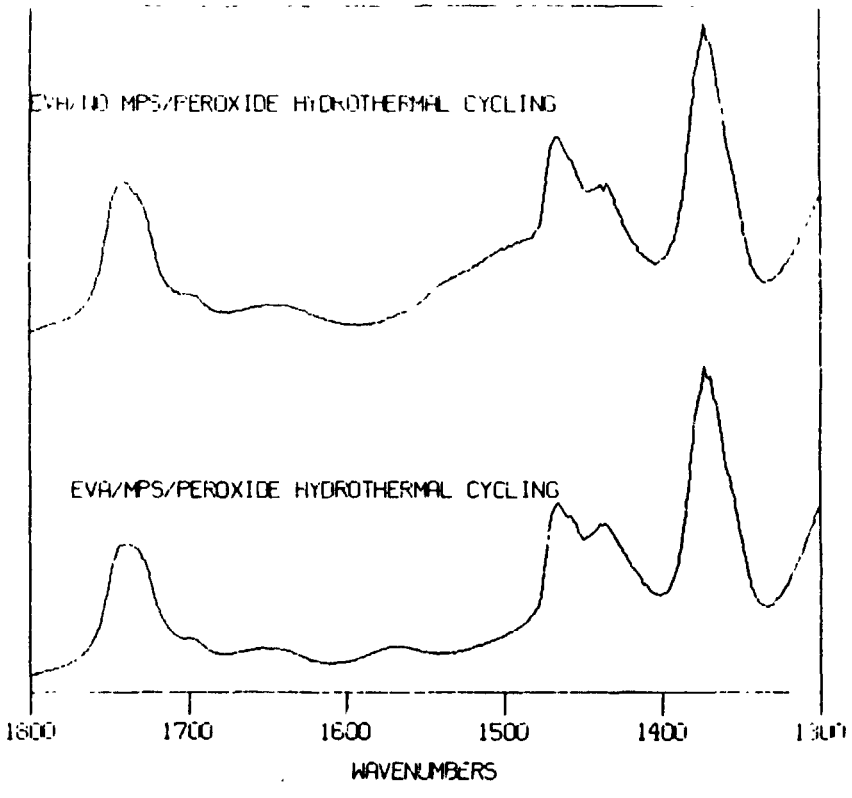

EVA / MPS / PEROXIDE
WITH AND WITHOUT HYDROTHERMAL CYCLING
20.
15.
10.
5.
0.
3800
3600
3400
3200
3000
2800
2600
2400
2200
WAVENUMBER (CM-1)

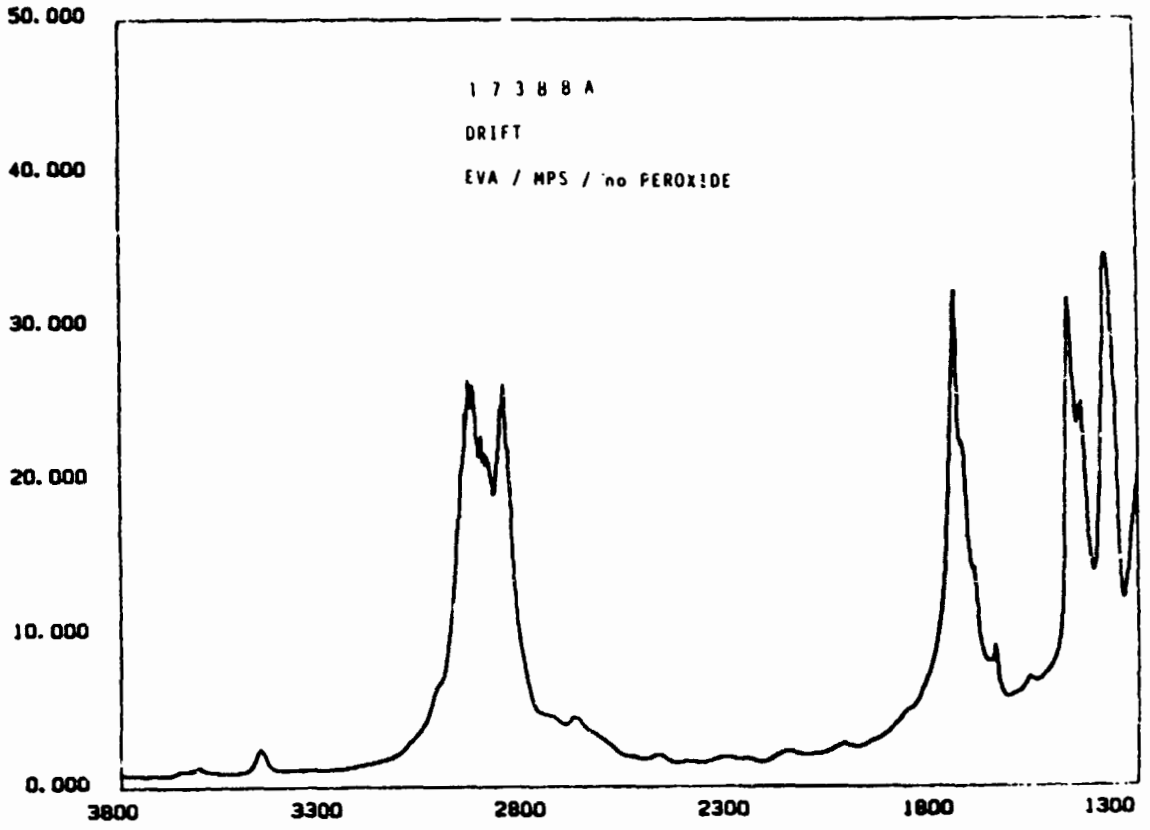
C-3

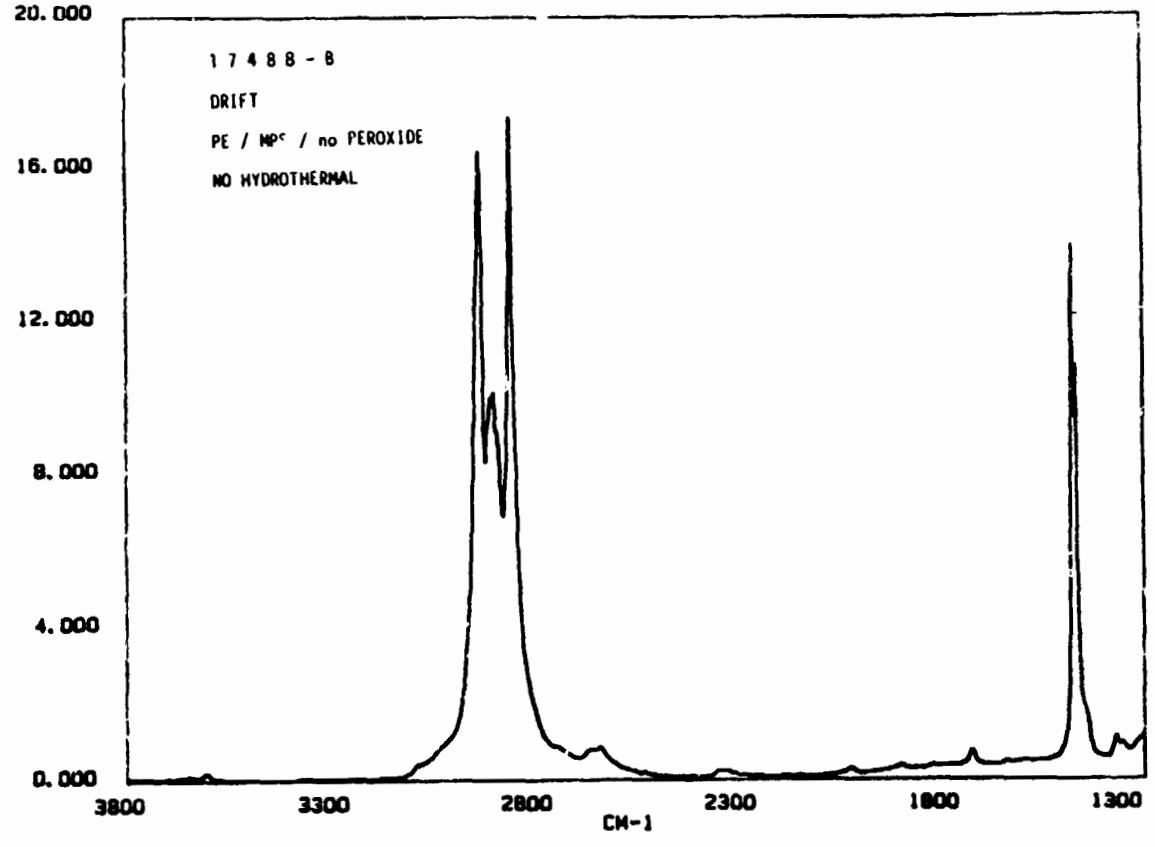

WATER IN O-H STRETCHING REGION
EVA / no MPS / PEROXIDE
EVA / MPS / PEROXIDE
EVA / no MPS / PEROXIDE HYDROTHERMAL CYCLING
EVA / MPS / PEROXIDE HYDROTHERMAL CYCLING
3800
3600
3400
3200
3000
2800
2600

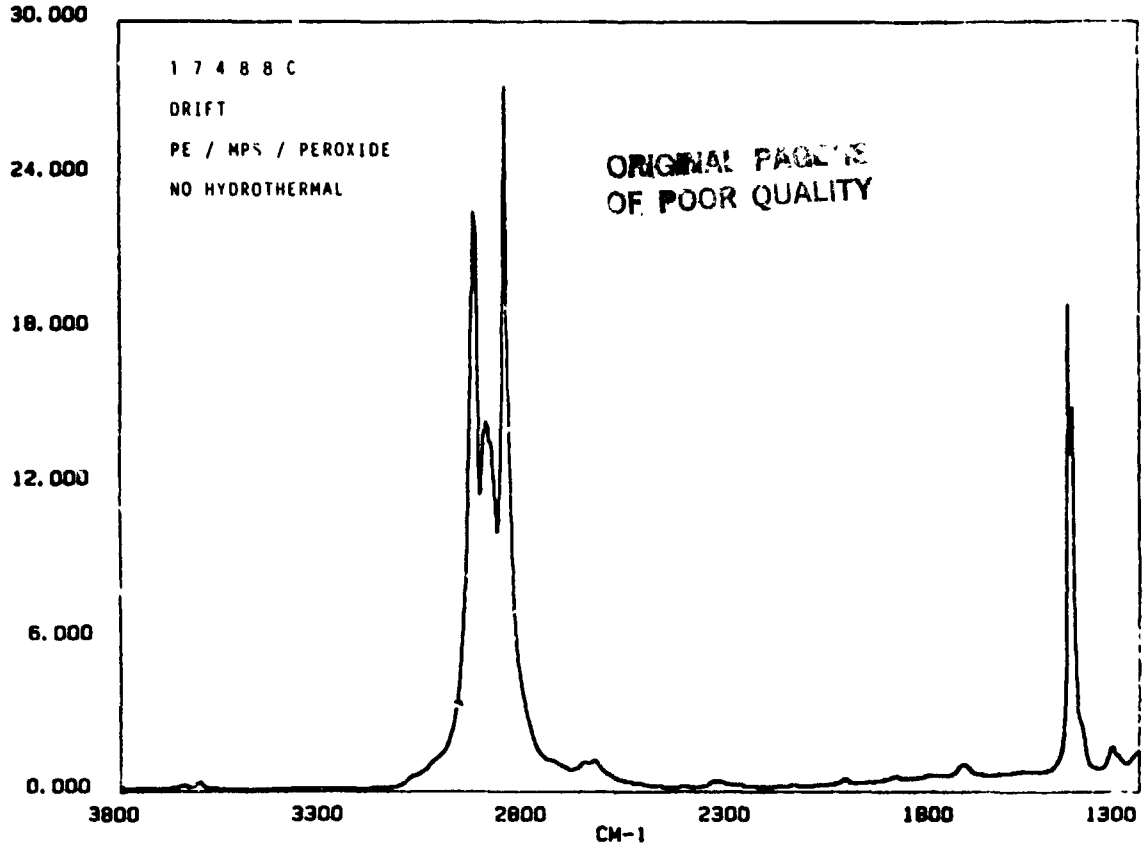
WATER in O-H BENDING REGION 1640 cm^{-1}

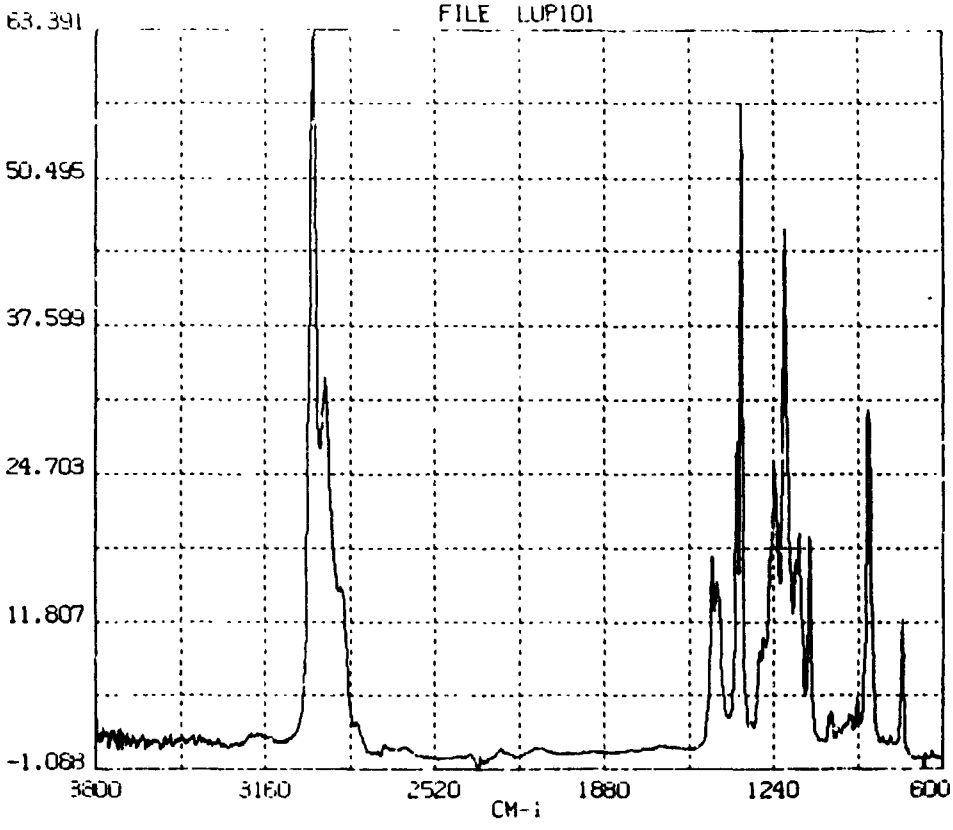


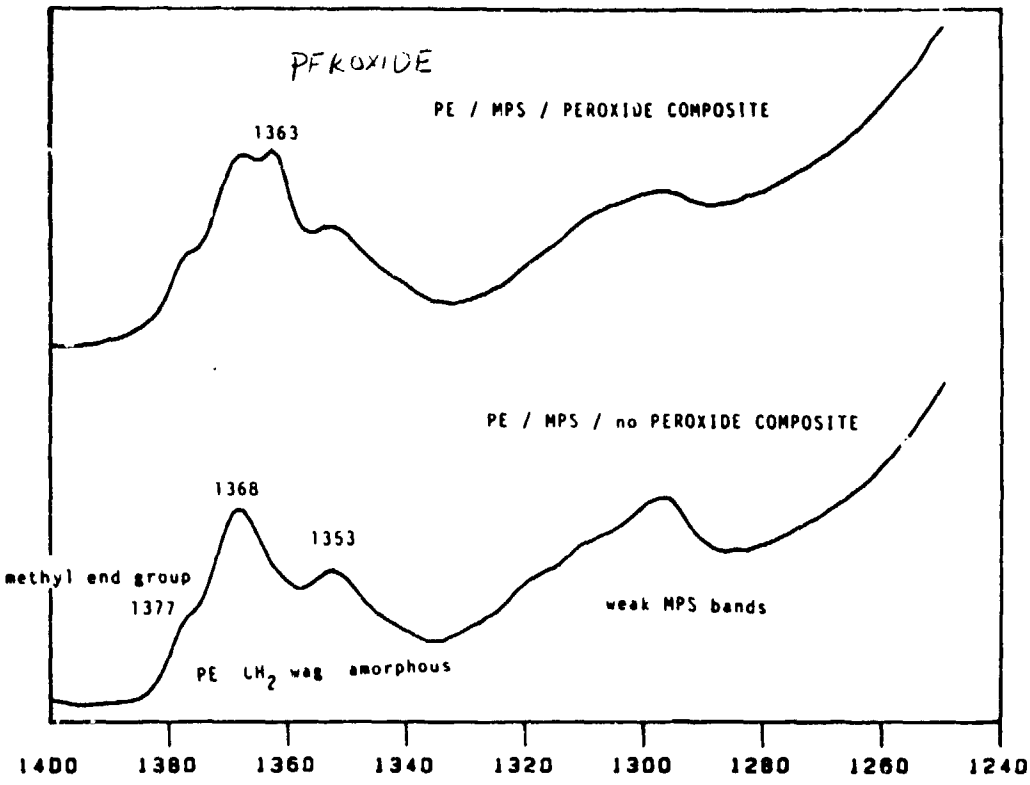


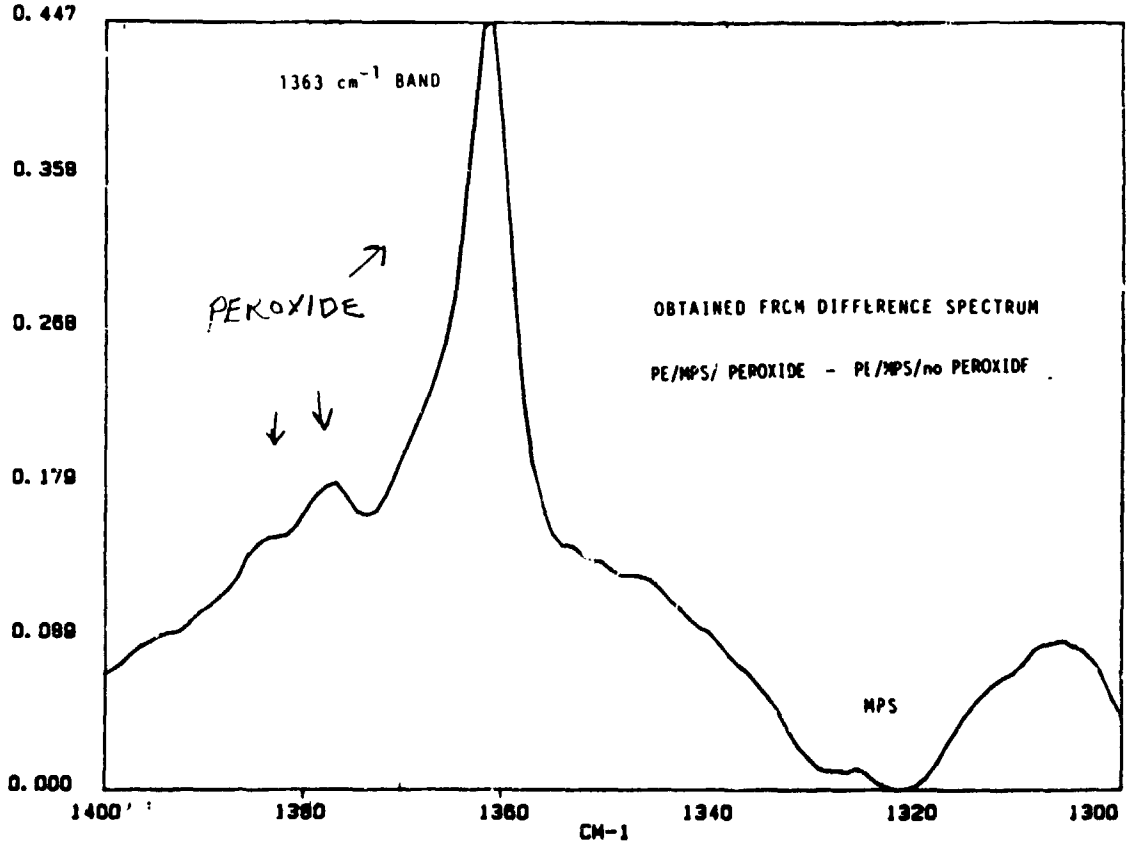


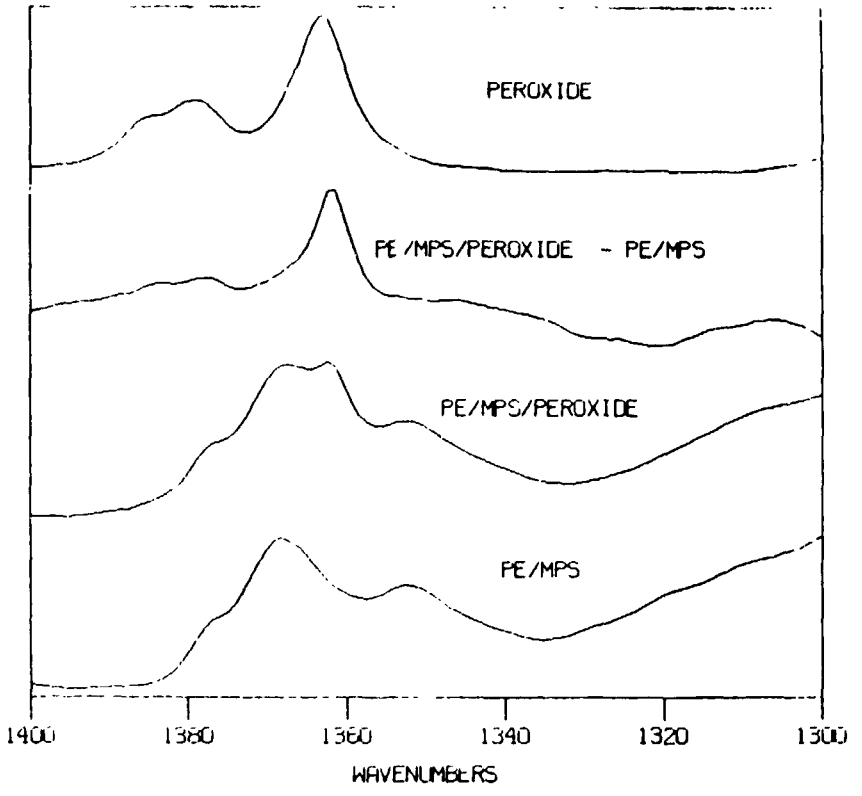



30.000
24.000
18.000
12.000
6.000
0.000
1 7 4 8 8 C
DRIFT
PE / MPS / PEROXIDE
NO HYDROTHERMAL
ORIGINAL PAGE IS
OF POOR QUALITY
3800
3300
2800
2300
1800
1300
CM-1

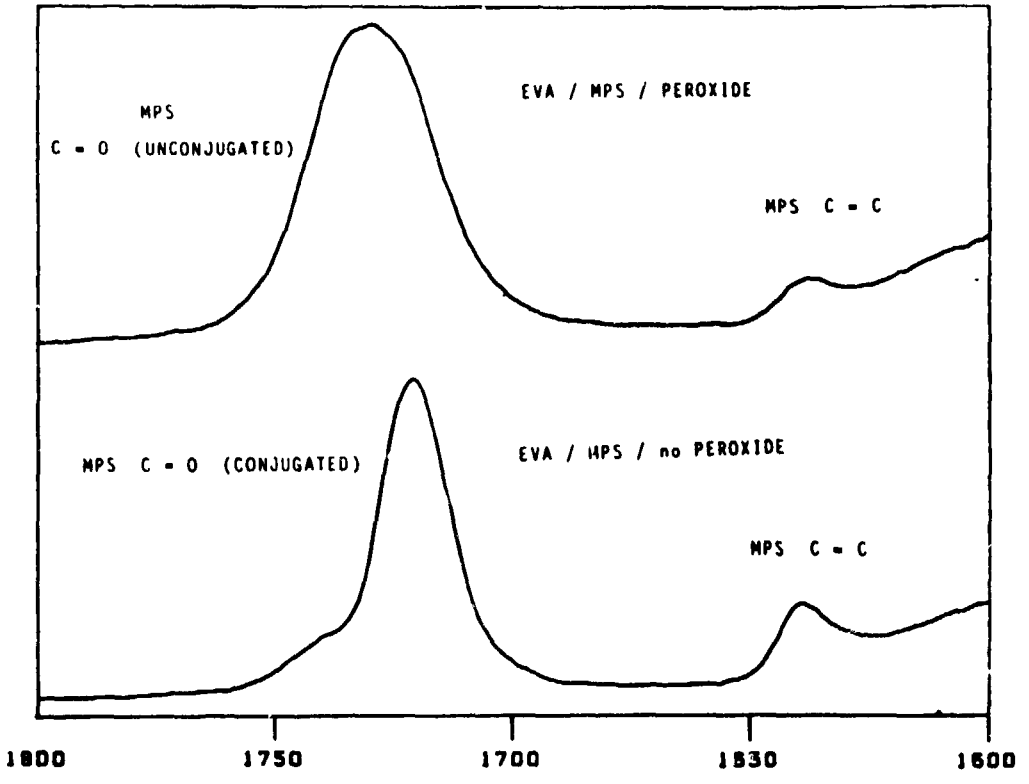

FILE LUP101
63.391
50.496
37.599
24.703
11.807
-1.088
3800
3160
2520
1880
1240
600
CM-1


PEROXIDE
PE / MPS / PEROXIDE COMPOSITE
1363
PE / MPS / no PEROXIDE COMPOSITE
1368
1353
methyl end group
1377
weak MPS bands
PE CH_2 wag amorphous
1400
1380
1360
1340
1320
1300
1280
1260
1240


0.447
0.358
0.268
0.179
0.089
0.000
1363 cm^{-1} BAND
PEROXIDE
OBTAINED FROM DIFFERENCE SPECTRUM
PE/MPS/ PEROXIDE - PE/MPS/no PEROXIDE
MPS
1400
1380
1360
1340
1320
1300
CM-1



COMPOSITE INTERFACE



MPS Reaction in PE

	C=C / C=O	%
MPS neat	0.138	100
PE / MPS	0.107	77.5
PE / MPS / peroxide	0.027	19.6

Weaker Interfacial Bands